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ABSTRACT

The Information Exchange Procedures (IEP) cost study project of the National Center for Higher Education Management Systems is described and its applicability to six major research universities (MRU) is assessed in this pilot study. The IEP enables peer institutions to compare information about their resources, activities, and educational outcomes. The technical findings of six universities (University of Colorado, University of Illinois, University of Kansas, Purdue University, State University of New York at Stony Brook, University of Washington) based on their experience in implementing IEP are discussed. Eight steps that each university followed in implementing the costing procedure are described. A discussion of the major findings covers the areas of faculty activity analysis, departmental research and the joint-product problem, MRU accounting procedures, modifications in the full-cost procedures of IEP, discipline and student-program data, and modifications to NCHEMS's costing and data management software. The strengths and weaknesses of IEP for MRUs are analyzed. It is concluded that although the data were not substantively or technically comparable, advances had been made through the pilot study toward achieving technical comparability between institutions. The need for substantive comparability in the IEP is noted and discussed. Potential applications of cost data for each pilot-test institution are described. (SF)

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Evaluation of IEP Costing Procedures

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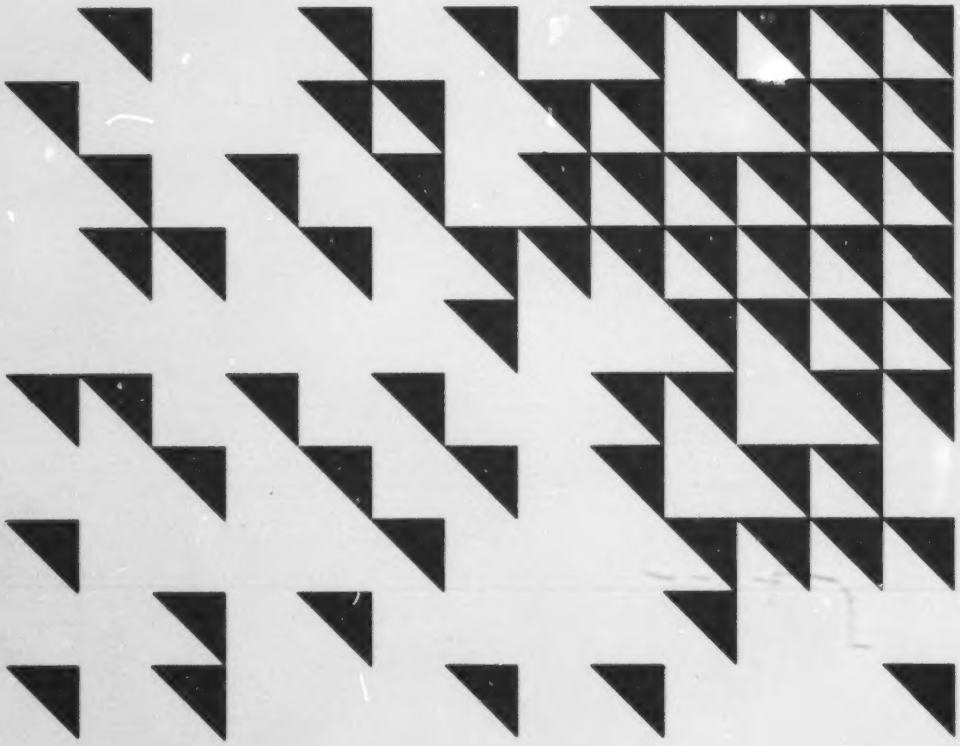
Information Exchange Procedures for Major Research Universities



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Evaluation of the IEP Costing Procedures:

A Pilot Study by Six Major Research Universities

Jim Topping
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March 1979

National Center for Higher Education Management Systems
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Preface

An original charge to NCHEMS was to develop a set of procedures and definitions that would enable peer institutions to compare information about their resources, activities, and educational outcomes. To fulfill this responsibility, NCHEMS developed in the early 1970s what eventually became known as the Information Exchange Procedures (IEP). Though IEP was generally accepted by colleges and universities, one sector of higher education—the major research universities—expressed reservations as to the applicability and validity of the procedures to their situation. Thus in early 1975, several of them petitioned the NCHEMS Board of Directors to reexamine certain portions of IEP from their perspective.

A task force representing the major research universities was subsequently appointed by the Board. Two working groups were formed—one to focus on the costing methods contained in IEP and the other on alternative approaches to information exchange. The first group, subsequently known as the Experimental Application and Analysis Subgroup, conducted an active pilot test of the costing portions of IEP to determine their relevance to a major research university. This work is documented in two reports:

- *Evaluation of the IEP Costing Procedures: A Pilot Study by Six Major Research Universities* (1979). A report that summarizes the technical

findings of six major research universities based upon their experience in implementing NCHEMS Information Exchange Procedures. Participating in the study were the University of Colorado, University of Illinois, University of Kansas, Purdue University, State University of New York at Stony Brook, and the University of Washington.

- *Technical Diary of the Major Research Universities' Pilot Test* (1979). A step-by-step commentary on the implementation and analysis of the NCHEMS cost-study procedures. Modifications to adapt the procedures to major research universities are included as part of the advisory-group recommendations.

The second group, known as the Measures and Definitions Subgroup, examined alternative approaches to information exchange among major research universities. Its work, largely conceptual in nature, was developed by representatives from public and private universities, including Stanford University, State University of New York at Stony Brook, University of California at Los Angeles, University of Michigan, and University of Rochester. Their report is entitled *Information Exchange Procedures for Major Research Universities: Alternative Conceptual Approaches* (1979).

Together, these three documents constitute the final report of the NCHEMS Major Research Universities Task Force. NCHEMS is indebted to the participants in this project for their contribution of time and energy. While substantive conclusions were not reached in all aspects of the study, significant progress was made in exploring the issues surrounding information exchange among major research universities and, in some instances, in suggesting tentative solutions to the problems. We publish these reports in the hope that they will help other universities that want to undertake similar comparative studies.

A. Ray Chamberlain
Chairperson, Board of Directors

Ben Lawrence
Executive Director

Jim Topping
Project Director

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A comparative cost study of six major universities is a large undertaking and could not be accomplished without the full support of those institutions participating in the study. The project director would like to acknowledge the aid and support of the following individuals who represented the pilot-test institutions:

University of Colorado:
- Russell Nelson, Chancellor of the Boulder Campus
- Jack Bartram, Vice President for Budget and Planning
- Mark Meredith, Director of Institutional Studies

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- Peter Czajkowski, Director of Long-Range Planning and Analysis
- Martin Zeigler, Associate Vice President for University Service

University of Kansas: Richard Mann, University Director for Institutional Research and Information Systems
Deborah Teeter, Director for Institutional Research and Planning

Purdue University: John Hicks, Assistant to the President
Howard Lyon, Fiscal Planning Director
Laverne Knodle, Director of Analytical Studies
Tom Schellhardt, Assistant Director of Analytical Studies

State University of New York at Stony Brook: Alexander Pond, Acting President
Raymond Maniuszko, Director of Institutional Studies

University of Washington: Robert Thompson, Vice Provost for Planning and Budgeting
Laura Saunders, Director of Planning and Analytical Studies

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1

Why This Study Was Undertaken

Colleges and universities compete with one another for scarce resources. Within institutions, academic departments and administrative units engage in similar competition. Despite this competition, no firm benchmarks exist for assessing the demand for resources in higher education. Though one might expect the allocation of resources to reflect the expected yield of products or services, the outputs of higher education are intangible, and there are no widely accepted conventions for measuring their value. Despite these limitations, comparisons both among and within institutions are common and have become increasingly influential in resource-allocation decisions. Thus in 1971, the National Center for Higher Education Management Systems (NCHEMS) initiated the Information Exchange Procedures (IEP) project to:

- Support institutional identification, acquisition and use of information necessary to carry out institutional comparative analysis, particularly in resource allocation
- Improve the quality and quantity of data that an institution can bring to bear on internal planning and management problems

NOTE: This chapter is based on "Major Research Universities Experimental Application and Analysis Subgroup Statement of Purpose" (1977), "Introductory Notes by the Advisory Committee" (Bacchetti et al forthcoming), and "Apples are Never Oranges: The Comparability Question Revisited" (Harris 1978).

- Assist institutions in the preparation and presentation of data to agencies and individuals external to the campus [NCHEMS 1975, p. 77]

These objectives and the expected uses of IEP reflect several assumptions basic to the project. The project was based on the conviction that the availability of better information will lead to improvements in institutional planning and management, but that simply providing more information to decisionmakers will not necessarily do so. Those developing IEP assumed that comparative analysis would help executives formulate alternatives in planning and management decisions. They also assumed that a set of selected historical data would be a useful starting point for comparative analysis and that sufficiently compatible data can be collected across institutions by establishing a fixed structure, definitions, and a set of procedures. Previously a widely held assumption was that the same structure, definitions, and procedures could be used for any educational institution.

As the results of the IEP project were disseminated, it became apparent that some states intended to use IEP to make intrastate cost comparisons among publicly supported colleges and universities. These plans to make comparisons across populations that ranged from community colleges to major research universities (MRU) aroused considerable concern among planners and administrators at major research universities. They believed that the underlying assumptions and design of IEP were inadequate to capture and display the salient characteristics of a major research university and that comparisons that failed to recognize these important differences in institutional character and mission might be invalid and could adversely affect the funding of complex research-intensive universities.

In studying the distinctions among major research universities, two important characteristics were identified.

> Perhaps the single most management-relevant characteristic of MRUs is . . . [that] institutional purposes are largely elaborations on the duties of the faculty, succinctly but accurately stated in the excerpt from the Statutes of the University of Cambridge:
>
> > The University duties of faculty members are to devote themselves to the advancement of knowledge in their subjects, to give the students instruction in those subjects, and to promote the interests of the University as a place of education, learning, and research.

This characteristic of the university as an organization means that universities are as much *settings* within which education, research [and public service] go on as they are organizations responsible for doing teaching, research [and public service], and certifying learning. As organizations, they have as large a stake in the intellectual independence of faculty and students as they do in cultural transmission, curricular coherence, the effective use of resources, and social progress.

A second distinctive feature of MRUs is the unification of [the] teaching, research [and public service] objectives within individuals and organizational units. So close is the coupling of these functions . . . that facts or information can only be properly understood in a larger context. The importance of this methodological stricture is often overlooked. The natural tendency of information systems is atomistic; they aim at reducing a whole to its smallest parts to display alternative interpretations. This natural tendency is not always legitimate. If two parts or aspects of something must *both* be present in order to represent it truly, then no intellectual purpose is served by reducing this union to its separate parts. In analyzing universities, this problem has come to be called the problem of jointness: When a library book serves both a research and a teaching objective, or when a professor in conducting research is also teaching a student, the functions are unified, are joint, and the frame of reference must marry, not divorce them in order for information about library books or how professors spend their time to convey meaning. [Bacchetti et al forthcoming]

To respond to expressions of these concerns by representatives of several MRUs, in 1975, the NCHEMS Board established the MRU-IEP project and appointed a task force to examine the following questions:

1. Given institutional differences in accounting, organization, and so forth, can data be collected from a group of major research universities in accordance with NCHEMS Information Exchange Procedures under controlled pilot-test conditions so that the resulting information is reasonably comparable?
2. Does IEP have the capability to deal with the interactions among instruction, research, and public service characteristic of major research universities?
3. Do existing information exchange procedures adequately account for different sources of funding in complex, research-oriented universities?

4. Do existing information exchange procedures adequately define direct and indirect costs to permit comparisons among major research universities?
5. Do the costing procedures recommended by the existing information exchange procedures adequately reflect the consumption of support services in major research universities?
6. How similar are major research universities to one another? To other postsecondary institutions?

The task force was also charged with developing approaches that would meet the needs of MRUs if it found IEP inadequate.

At the first meeting, task-force members differed on the approach to their assignment. Some favored testing the validity of IEP for major research universities by means of a controlled experiment. Others believed that the conceptual framework of IEP should be reexamined and, if necessary, redefined. As a compromise, it was decided that the task force should proceed as two subgroups.

The first group, the Experimental Application and Analysis Subgroup, adopted three guidelines for conducting its work:

- Data would not be forced to demonstrate comparability among schools, disciplines, or programs
- Modifications and additions to IEP would be made as needed, with the agreement of the group
- The experiment would be terminated at any time that the group concluded that IEP was inapplicable to major research universities

The purpose of these guidelines was to assure an objective, honest test of IEP rather than an effort to make IEP work regardless of the compromises.

The second approach was pursued by the Measures and Definitions Subgroup. Its work resulted in a draft manual entitled *Information Exchange Procedures for Major Research Universities: Alternative Conceptual Approaches* circulated for review in late 1977.

The work of the Experimental Application and Analysis Subgroup has now been completed. The remainder of this report describes how the test was conducted, presents the major findings and conclusions, and discusses the implications of IEP for comparative analysis within and among major research universities.

2

Organization of the Study

Implementation of the Information Exchange Procedures (IEP) cost study at any college or university is a complex task, often involving the collection and analysis of data in various formats from several different institutional offices. The task is further complicated when one attempts to collect data in compatible formats from several institutions. To overcome these problems, NCHEMS designed a general set of costing procedures to accommodate a wide range of institutional data-collection practices. While NCHEMS costing procedures do not guarantee data comparability, they provide a common framework for conducting comparative cost studies. The Major Research University-Information Exchange Procedures (MRU-IEP) study attempted to determine if the NCHEMS costing procedures and associated software can support comparative cost studies among major research universities.

The objective of the MRU-IEP cost study was to develop programmatic, full-cost data by discipline and course level and by student major and student level. It is not the purpose of this report to explicate all of the general IEP procedures and guidelines for producing programmatic full-cost data; those procedures are covered in other NCHEMS technical reports, specifically *Procedures for Determining Historical Full Costs* (1977). Instead, this chapter will briefly describe the sequence of steps that each university followed in implementing the NCHEMS costing procedures. Chapter 3 will then discuss

the problems that were encountered in implementing these costing procedures in major research universities (MRUs) and will present the technical findings and recommendations made by the pilot-test group for modifying the existing procedures. These procedural modifications are elaborated on in the *Technical Diary of the MRU Pilot Test* (Topping forthcoming).

Eight Steps of the Cost Study

The implementation process for the MRU-IEP cost study was organized into the following eight steps (see figure 1).

Step 1: Inventory of Student Programs and Academic Disciplines. Each institution was asked to prepare an inventory of its student programs and discipline offerings using the four-digit codes employed by the National Center for Education Statistics in its annual Higher Education General Information Survey (HEGIS). The purpose was to identify discipline and student-program groupings that would permit meaningful comparisons of data during the later steps of the study.

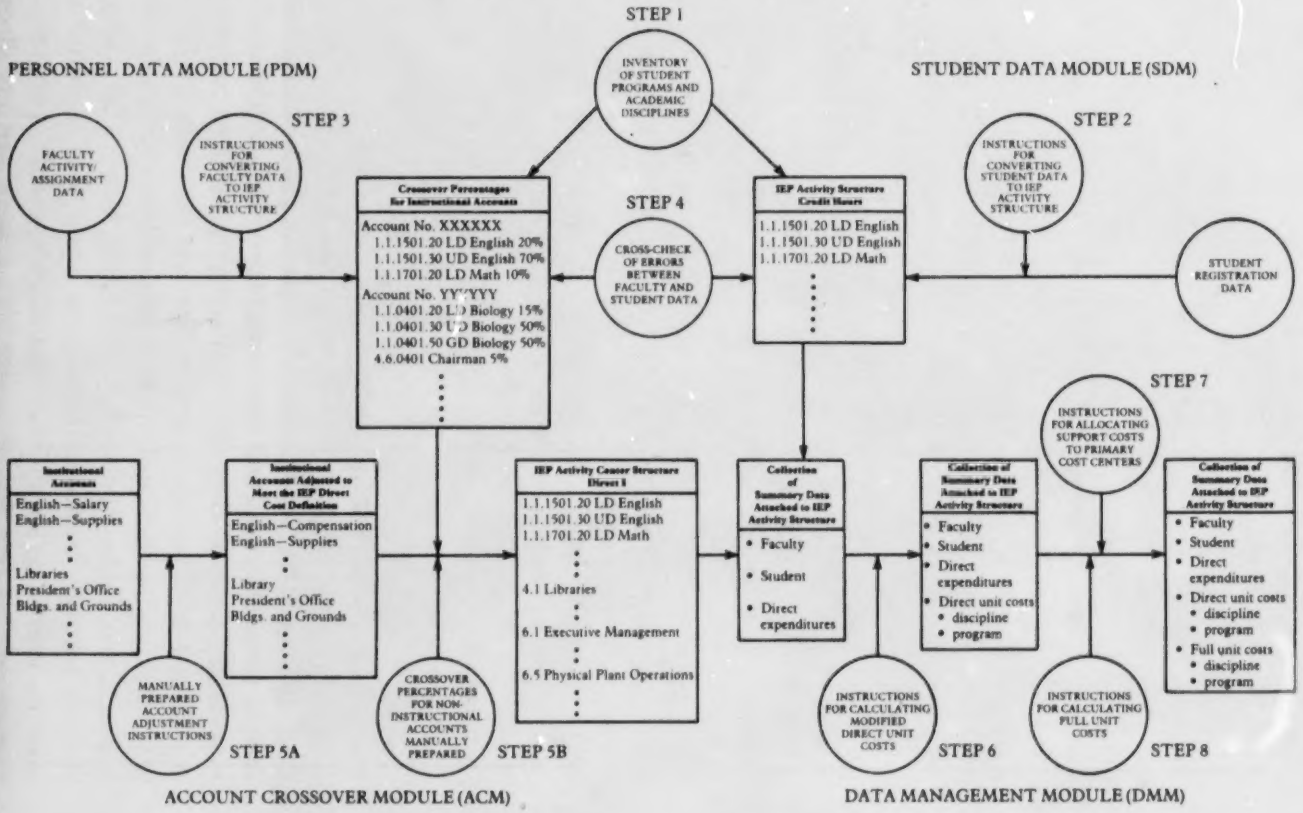
Step 2: Collection and Analysis of Student-Registration Data. In this step, an Instructional Work Load Matrix (IWLM) was developed for each institution. Constructed from student-registration data, this matrix quantifies the relationships between the academic departments offering the course work and the declared majors of the students taking the courses. The IWLMs were later used as the transition matrices to produce *programmatic* cost information.

Step 3: Collection and Analysis of Faculty-Activity Data. Most institutions participating in the pilot test already had faculty-activity reporting systems. The major task in this step was to review each institution's faculty-activity reporting system and, as a group, determine a set of faculty activities common to all the institutions. These common activities included the primary programs of instruction, organized research, public service, and academic-support functions necessary for representing an MRU. Faculty data, including both activity and compensation information, were needed to determine how the expenditures of an academic unit were to be distributed to IEP activity centers.

Step 4: Cross-Check of Errors between Faculty and Student Data. To relate faculty data to student data, both sets had to be coded to an identical activity structure. Frequent mismatches among disciplines and course levels occurred. The purpose of this step was to resolve mismatches between the two data sets

FIGURE 1

INFORMATION EXCHANGE PROCEDURES
STEP-BY-STEP IMPLEMENTATION PROCESS AND REVIEW



before proceeding with the analysis and simultaneously to resolve other errors in the two sets.

Step 5: Collection and Analysis of Institutional Expenditure Data and Production of Modified Direct-Cost Data. In step 5, each institution's current funds expenditure data were segregated by fund category, reconciled, and crossed over to the IEP activity structure. Again, the purpose was to ensure that like activities (expenditures in this case) were categorized in a similar manner to permit comparisons across institutions. An additional series of departmental allocations was added to the procedures to adjust for differing faculty-activity surveys. Finally, it was important that each institution reconciled its total current funds expenditures to its audited financial statements.

Step 6: Calculation and Analysis of Modified Direct Unit Costs for Academic Disciplines and Student Programs. A *unit cost* is simply the total cost of an activity or service divided by the number of units of that activity or service produced within a given period. Expressing costs in terms of units of activity facilitates comparisons—with a predetermined cost, a cost of past activities, or the cost of a similar unit of activity in another organization. In this study, the agreed-upon unit of activity for instruction was the semester credit hour (except for doctoral dissertation, for which each enrollment was counted as a single unit). Steps 1 and 2 facilitated the collection and analysis of the credit-hour information, that is, the denominator of the unit-cost equation; steps 3, 4, and 5 were concerned with the collection and analysis of the cost data, or the numerator of the equation. Step 6 was the first attempt to merge these data files to produce unit-cost data for each of the two-digit HEGIS discipline categories and for each of the course levels within those HEGIS categories. Similarly, through the use of the Instructional Work Load Matrix produced in step 2, modified direct unit costs were produced for each student program and each student level within those student programs.

Step 7: Collection and Analysis of Assignable Square Feet and Allocation of Indirect Costs. Before full unit costs could be produced, each institution needed to perform a series of allocations distributing their indirect-cost pools to those cost centers previously designated as final-cost objectives. In IEP, the final-cost objectives fall principally within three primary programs—instruction, research, and public service—but also include some of the student-support services normally treated as auxiliary services, such as dormitories, food services, intercollegiate athletics, and all independent operations. All other support services were considered indirect and were therefore allocated to the final-cost objectives. As part of this step, assignable-square-feet data were

collected and analyzed to facilitate the allocation of plant operation and maintenance.

Step 8: Calculation and Analysis of Full Unit Costs for Academic Disciplines and Student Programs. Once full costs were determined for each discipline and course level, unit costs were calculated by dividing those totals by student credit hours generated at each course level. By multiplying the full unit costs through the Instructional Work Load Matrix, unit costs were also produced for each student major and student level. These figures were then converted to cost per FTE student by multiplying the unit cost figures by a previously agreed-upon standard.

The Pilot Test

The pilot test began in March 1976 and continued for two and one-half years. It focused on summarized data from the 1975-76 fiscal year. The pilot-test group initially consisted of five university campuses:

- University of Colorado at Boulder
- The University of Kansas at Lawrence
- Purdue University at West Lafayette
- University of Illinois at Urbana-Champaign
- State University of New York at Stony Brook

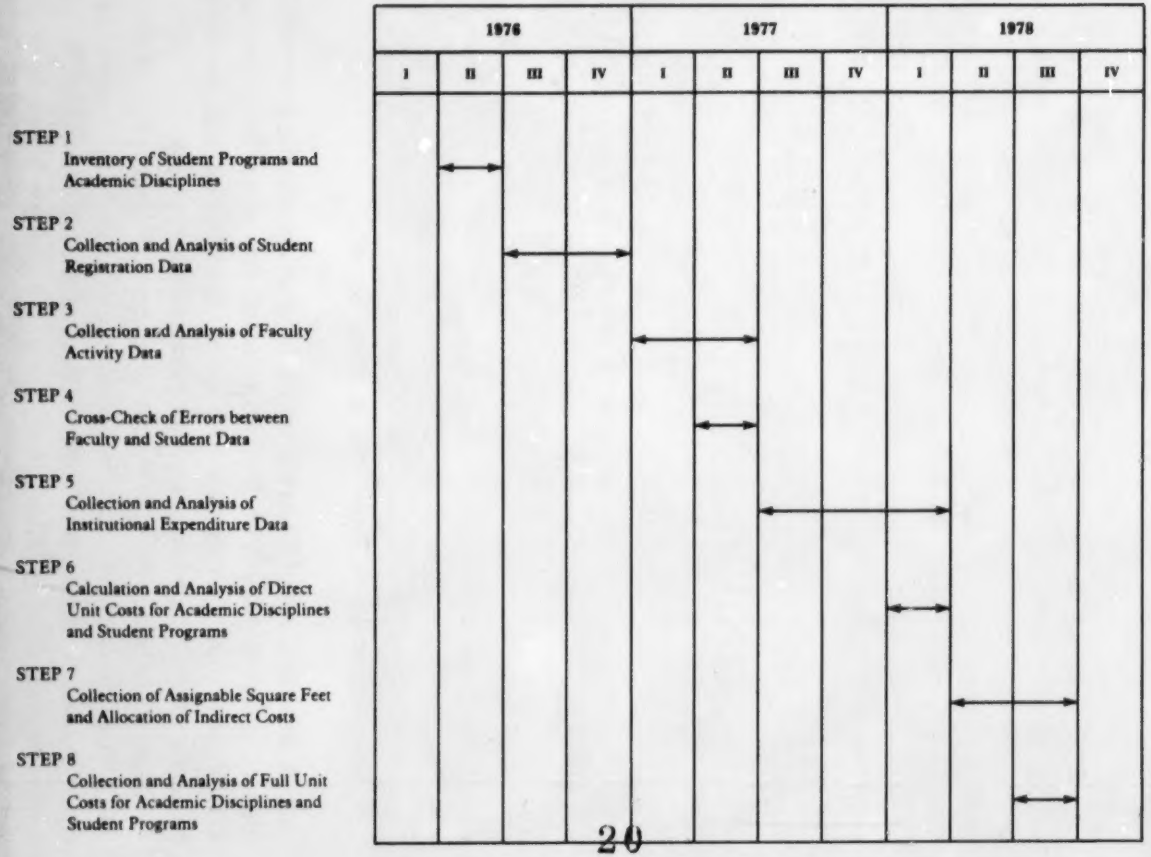
A sixth university, the University of Washington, joined the group midway through the pilot test. With the exception of data from the University of Washington, most data dealing with the medical schools and the teaching hospitals were excluded to avoid complicating the analyses.

Figure 2 indicates the approximate time devoted to each step of the pilot test. One should not conclude from examining figure 2 that it takes two and one-half years to implement the procedures contained in MRU-IEP. Implementation time for the University of Washington, which joined the pilot test at a later date, was in the range of six to eight months. The pilot test was substantially lengthened in accordance with its guiding philosophy,[1] that the effort was not simply six universities independently implementing IEP and

1. It is the collective opinion of the pilot-test group that the time period required for successive comparative cost studies among MRUs could be substantially reduced if the problems discussed in chapter 3 were satisfactorily resolved prior to implementation of the procedures.

FIGURE 2

SCHEDULE FOR THE PILOT TEST OF THE IEP COST STUDY AT SIX MAJOR RESEARCH UNIVERSITIES



then comparing the final results. Rather, the pilot-test institutions decided at their initial meeting that following each step of the implementation process, they would carefully review the data to evaluate the degree of comparability among the six institutions. If they determined that the data in the step being examined were not comparable, implementation would halt until a satisfactory solution to the problem could be found. The purpose of this step-by-step implementation and evaluation process was to ensure the validity of the investigation. For each step, the group completely documented the problems encountered, analyses performed, and conclusions reached. As part of this documentation, each university submitted a protocol statement describing problems that it encountered in the data-collection process and methods for solving them. The complete documentation of the pilot test, including the protocol statements submitted by the pilot-test schools, is contained in a separate book (Topping forthcoming).

Cost of the Cost Study

Cost estimates for the two and one-half year implementation period ranged from $30,000 to $62,000 per institution. Roughly one-third of those costs was attributable to data processing, the remainder to staff salaries, benefits, and travel. Cost estimates varied among the six universities for several reasons. Paramount among these was the degree of difficulty of adapting existing institutional data bases to the Information Exchange Procedures. Another was the amount of experience of university staff in conducting comparative cost studies, and a third was the amount of time senior-level administrators devoted to the project.

In addition to the institutional costs, NCHEMS contributed about $200,000 to support the pilot-test effort. NCHEMS staff processed a major portion of the universities' data, developed and tested additional software for the MRU modifications to the procedures, analyzed data, and produced reports to facilitate comparisons of the data. The balance of NCHEMS efforts was in general support of the project, which included staff support of the study group, drafting and publication of the documents, and staff and study-group travel.

A university that seeks to replicate the MRU-IEP cost study should not expect that the cost estimates of this pilot test will reflect its own costs. The nature of the pilot test tended to expand the time frame, thereby increasing the

costs to the institutions. However, NCHEMS provided a substantial amount of technical and general support, thereby decreasing each institution's total cost. It is the opinion of the six pilot-test institutions that an MRU attempting to replicate this cost study without technical assistance and with no experience with the IEP costing procedures could double and perhaps triple the implementation costs reported in this pilot test.

3

Technical Findings of the Study

Testing the Information Exchange Procedures (IEP) soon revealed that substantial modifications or additions would be needed to address the questions raised in the charge to the study group. This chapter discusses the major technical findings of the pilot test, listed in the order of their significance to the final outcome—establishing comparable sets of cost data for the six universities.

Faculty Activity Analysis

A critical element of this kind of cost study is the Faculty Activity Analysis (FAA). Faculty-activity data are used to allocate faculty compensation costs to various activities. Subsequently the same allocation percentages are used to allocate academic-department support costs to activities. Faculty-effort data, which historically have been a major problem in cost studies, not surprisingly presented significant problems in this study as well.

Certain *technical* problems were found in using existing faculty-activity information of participating institutions. This study was conducted retrospectively on faculty-activity data previously collected and analyzed by the pilot-test institutions. Many of these problems could have been avoided if the

participating institutions had agreed in advance on a single faculty-activity survey instrument and had administered it uniformly. Technical problems included:

- Not all institutions had complete FAAs for all the terms or semesters being examined and had to derive information from periods available. In particular, summer data were not always available.
- Populations included in the FAAs varied. Some institutions surveyed only ranked instructional faculty. Others surveyed broader pools that included all instruction and research faculty, administrators, extramurally funded research staff, assistants, and others with academic titles.
- Differences in definition or assignment of full-time equivalents (FTEs) particularly affected reporting for graduate assistants who had FTE values for similar appointments ranging from 0.25 to 0.50. (This particularly affected intermediate reports on such matters as number of service months and productivity ratios. All costs were ultimately reported, but assignment to activity or level could be influenced by these differences.)
- The number of reporting categories varied from 9 to more than 15. The group suggests a small but uniform set for future cost studies to include the following:
  - —Instruction and related activities
  - —General fund or restricted fund research in institutes and research centers
  - —Other separately budgeted research
  - —Departmental research and professional development
  - —Academic, student, and institutional support
  - —Public service
  - —Cooperative extension services

It appears that at least this number of activities are needed to report the multiple faculty activities in major research universities. Additional data needed for internal use should be treated as subsets of these aggregated categories. To reiterate, if major research universities were to agree prospectively on the FAAs to be used, many of these technical problems could be resolved.

In addition to the technical problems, two major conceptual problems arose in working with the FAAs. The first, regarding reporting methods, is described below. The second, concerning departmental research, is treated in the following section. One of the most significant conceptual differences

was having faculty activity reported by *institutional assignments* (in contrast to *self-reporting* of professional time across a broader grid of activities). A hypothetical example of applying the two reporting methods to the activities of a single individual illustrates the differences. (In this example, we assume no separately budgeted research or service activity.)

Activity	Assignment	Self-Reporting
Instruction of courses	Instruction	Instruction
Institutes and research centers	NA	NA
Separately budgeted research	NA	NA
Departmental research and professional development	Instruction	Research
Academic, student, and institutional support	Instruction	Institutional administration, Student services or Academic administration
Public service	Instruction	Public service
Cooperative extension	NA	NA

The underlined activities illustrate the differences in reporting methods. Ordinarily, under the assignment method, a full-time faculty member is *expected* to do departmental research and professional development, participate in departmental and institutional committees, advise students, and perform public service as part of his assigned activity. Only special assignments, such as departmental administrative duties, new course development, or an exceptional amount of research or public service, would be recognized in the FAA report prepared for the faculty members. In contrast, under the self-reporting method, the faculty member's estimate of how his professional time is spent is used to distribute faculty effort to program categories regarded as part of the so-called normal assignment and to the other activities shown in the example.

Two participating institutions used the assignment method, and four used self-reporting. The differences in reported activity were so significant that the study team decided to treat all the faculty activity as though it had been on an assignment basis in order to carry out the other tests. Therefore *Modified Direct Costs* were produced, in which faculty activity reported under departmental research, course and curriculum development, and student advising were prorated back as instructional expense. Academic administration was

prorated to instruction, research, and public service. The use of Modified Direct Cost produced a greater level of comparability among the pilot test institutions.

Departmental Research and the Joint-Product Problem

A major objective of the MRU-IEP project was to devise ways to account adequately for the joint production of instruction, research, and public service in which major research, doctoral-granting institutions engage. The Ad Hoc Committee that identified the problems that Information Exchange Procedures presented for major research universities summarized the joint-product problem:

> *Joint Products:* IEP requires that departmental activities and therefore departmental costs be disaggregated into instruction, research, and public-service components. To a large extent, this is now being done on the basis of primary intent. The interrelationships of these three costing components have never been satisfactorily examined for the purposes of costing. This problem is particularly acute for major research universities. [NCHEMS 1975b, p. 126]

One question addressed in the study was: Do existing IEP procedures adequately treat the costing of activities that produce joint products? If not, what modifications are necessary? The answer is: No, IEP lacks procedures to aid institutions in joint costing. Furthermore, the study group does not know of any other techniques now available that adequately address this problem. The joint product problem is less significant when major research universities (MRUs) are making comparisons with each other than with institutions having other roles and missions. Faculty in MRUs are generally expected to do research or other scholarly activity and public service as part of their institutional assignment. Tangible outputs of the scholarly and service work are evident in such forms as papers, books, objects of art, artistic performances, and patients seen. Although there is tangible evidence of this activity, it is difficult to cost and even more difficult to calculate benefits. The major problem with joint products arises when MRU costs are compared with institutions having different roles and missions.

A related aspect of the joint-product problem is departmental research. The manner in which departmental-research costs are attributed to the different levels of instruction can have significant effects on the reported costs. The MRU study group discussed several methods used in allocating departmental research and could not agree on a theoretical basis for accepting any one of them. This study group arbitrarily decided to assign departmental research costs to upper division and graduate-level costs in proportion to the faculty compensation reported at those levels. The assumption was that the benefit to students of increased scholarly competence of the faculty flowed primarily to the upper-division majors and graduate students in the discipline. In addition, since much lower-division teaching in MRUs is done by graduate students whose stipends are based on their instruction responsibilities and not their research, it seemed inappropriate to allocate departmental research costs of ranked faculty to a pool that included a significant amount of graduate student compensation. Since only MRUs participated in the study, there was no formal opportunity to test the impact of this allocation scheme on institutions with different missions.

MRU Accounting Procedures

A major MRU concern about the existing IEP was that information is not differentiated by source of funds. Large amounts of institutional activity at MRUs are funded through contracts and grants from outside sponsors, including significant reimbursements for indirect costs associated with these activities. MRUs engage in substantial amounts of auxiliary-enterprise activities as well. A major change in the basic IEP procedures therefore was to gather all expense data by the following funding sources:

- *General funds,* primarily from state appropriations and student tuitions (or fees charged for instructional activity)
- *Indirect-cost recoveries*
- *Restricted funds* from various grants, contracts, and gifts whose use is determined by the grantor
- *Auxiliary funds* derived from user charges

By producing four sets of IEP cost data (one for each source of funds), it was possible to identify the different mix of activities supported by the four funding sources. This information, which is useful in comparing MRUs, is even more significant if MRU costs are to be compared with costs of other types of institutions that have markedly different funding patterns.

A further change in IEP procedures was to gather and retain, through much of the analysis, information by expenditure type. The objects of expenditure used were academic salaries, academic fringe benefits, nonacademic salaries, nonacademic fringe benefits, and all other current fund expenses. For more detailed studies, the study group suggests additional separate categories for graduate-assistant salaries and fringe benefits, including fee remissions. However, for aggregate comparisons, the study group felt that a two-part breakdown consisting of academic compensation (salaries and fringe benefits) and all other expenses would be sufficient.

The expenditure information was generated from institutional accounting records or outside sources and reconciled to the published financial reports. Even though the institution's financial reports conform to generally accepted accounting principles, many significant differences in financial reporting must be addressed in studies of this kind. The following adjustments to the financial data were necessary:

- Some states pay certain fringe-benefit costs centrally that are not reported in the institutional financial statements. These costs were added.
- Many public MRUs are part of a multicampus system. Therefore it was necessary to add the costs of central services performed for the campuses and to delete costs of services performed at the MRU campus for other campuses in the system.
- Some institutions budget and account for indirect-cost-recovery expenditures in a separate fund source. Other institutions treat indirect-cost recovery as an unrestricted general fund income and do not differentiate between general and indirect-cost-recovery expenditures. In the latter case, indirect-cost-recovery expenditures were prorated by the cost-recovery formula through which they were generated.
- Some institutions treated service centers such as motor pools, print shops, and warehouses with accounting techniques that recorded expense both to the user and to the service center. These duplications were eliminated and the cost assigned to the user account.

- Some institutions regarded such cost centers as health services or residence halls as part of the general fund activity. These institutions reassigned these expenditures to auxiliaries.
- Special techniques were required to distribute faculty and staff fringe benefits from central accounts to various cost centers. This included treating fee remissions of graduate assistants as a fringe-benefit expense.

Each institution provided reconciliation statements to show the impact of these adjustments on the annual-report control totals and protocol statements to explain the reasons for the adjustments. One adjustment that was not resolved related to computers or other costly equipment. Some institutions included an annual share of capital cost in their charges to users. Others had purchased machines, and therefore no current capital costs appeared in their charges. Any future study should adopt conventions for resolving this matter.

The adjustments made in this cost study to the annual-report financial data were significant. Any future study should pay careful attention to the need for adjustments such as those discussed in this section.

Modifications in the Full-Cost Procedures of IEP

Several important modifications were made in the full-costing procedures of IEP, including:

- A major change in IEP allocation procedures was the introduction of the Modified Direct Cost step, in which faculty-activity costs initially reported under the self-reporting method were reclassified (see p. 14).
- Most of the support-cost allocations were based on modified direct costs.
- Capital costs, for the most part, were excluded, because major cost differences could be introduced into the study that were solely a function of when a particular facility was constructed or of local construction costs. However, data on amounts of space available by space type were gathered and exchanged.
- The six institutions varied in the extent to which support costs such as physical plant and administration were already allocated as part of the institutional accounting policies. This was particularly true in regard to auxiliaries. Each institution provided specific allocation-decision rules to adjust for these variations.

- IEP does not readily provide for allocating academic-administration cost centers, such as college deans' offices, back to the disciplines. Thus it was necessary to make separate allocations to assign college costs to disciplines before making campus-wide allocations of central costs.
- Originally a step-down procedure[2] was considered for allocating certain support costs for each of the four sources of funds. After testing the data of a single institution, it was concluded that a one-step allocation was sufficiently precise.

Discipline and Student-Program Data

Since a primary use of IEP is to develop discipline and student-program costs, agreement was necessary on the coding of course and student data. All the institutions reported their 1975-76 student registration information using the four-digit HEGIS coding. When the data were compiled, wide variation existed in the way in which the four-digit HEGIS codes had been assigned to disciplines and, to a lesser extent, to programs (see table 1). For example, institutions tended to use the HEGIS codes that best fit the departmental structures that also served as their cost centers. Furthermore, some institutions used the general division heading (such as 0400) instead of the first discipline heading (0401) to report the same kind of activity. Even after this kind of divergent reporting was corrected, the institutions still found substantial diversity at the disaggregated four-digit level.

A comparison by four-digit codes of the disciplines and programs of the pilot-test universities showed that more than 50 percent occurred at only one university and could not therefore be compared; about 20 percent occurred at only two universities; and roughly 30 percent occurred among comparison groups of three or more universities. Given the lack of significant numbers of matching discipline and/or program HEGIS codes at the four-digit level, it was decided to convert to the broader, two-digit HEGIS level to produce and display cost data. Data were still gathered and processed at the four-digit level, even though they would be summarized and reported at the two-digit level. Summarizing data at the two-digit level increased the extent to which

2. A cost-allocation technique based on the premise that support activities may contribute costs to other support activities before they are allocated to final cost objectives.

TABLE 1

SUMMARY OF BIOLOGY BY DEPARTMENT–DISCIPLINES

		Purdue	Illinois	Colorado	Stony Brook	Kansas	Washington
0400	Biological Sciences						
0401	Biology	X	X	X	X	X	X
0402	Botany		X				X
0404	Plant Pathology		X				
0407	Zoology		X				X
0408	Pathology						X
0409	Pharmacy & Toxicology					X	X
0410	Physiology						X
0411	Microbiology		X			X	X
0414	Biochemistry	X	X		X		X
0415	Radiation Biophysics					X	
0416	M.C.D. Biology			X			
0417	Cellular & Comparative				X		
0418	Marine Environmental Studies				X		
0420	Environmental Studies		X		X		
0421	Entomology	X	X				
0422	Genetics						X
0424	Nutritional Sciences		X				
0449	Physiology & Biophysics		X				
0470	Botany & Plant Pathology	X					
0492	Pharmacy & Toxicology	X					
0494	Bionucleonics	X					
0499	Biological Structure						X

quantitative comparisons of disciplines and programs could be made. Approximately 75 percent of all student credit hours were now in HEGIS codes common to all pilot-test universities.

While the two-digit HEGIS data comparisons increased the number of apparent discipline and program matches among the pilot-test universities, it gave no assurance to the study group that the underlying activities were in fact comparable. Some two-digit HEGIS categories in fact included widely varying activities for which cost data were not comparable. Therefore the study group recommends for future studies the use of a modified two-digit HEGIS coding that would separate such areas as:

- Education (0800 series) into Education and Physical Education
- Fine Arts (1000 series) into at least the areas of Music, Art, and Theater
- Health Professions (1200 series) into the discrete health professions—Medicine, Nursing, Pharmacy, Dentistry, Veterinary Medicine, and so forth.

Although some have proposed that individual courses be mapped to HEGIS categories according to their specific course content, the study group disagrees. Instead, they believe that the results of studies are most useful internally when they can be readily mapped to departmental organization or major subdivisions. This decision, however, may ultimately decrease the utility of the data for external comparisons.

Course levels used in IEP were expanded from three (lower division, upper division, graduate) to five (lower division, upper division, graduate I [master's level], graduate II [doctoral-level courses], and doctoral dissertation). Because no standard method exists of reporting the credit-hour equivalency of doctoral dissertation, data were collected and analyzed based on the number of term registrations for doctoral thesis. A sixth course level for professional courses, such as health professions and law, might be useful in future studies.

Dual-level courses presented a problem to the study group. They adopted a covention that courses that were targeted toward more than one student level should be designed to the level represented by the modal enrollment. Thus a course taken by both master's and doctoral students would be classified as Graduate II if more than half were doctoral candidates. In developing student-program costs, doctoral-level course costs and dissertation-level costs were combined. Dissertation units were each imputed at nine credit hours as an arbitrary unit of equivalency.

The study group used five student-program levels (lower division, upper division, graduate I, graduate II and first professional). For external use, the pilot-test group felt that comparison of student-program-level costs were probably more valid than discipline-course-level costs because of institutional differences in course-level assignments and in assignments of courses by department rather than content.

The study group examined a histogram in comparing the relative enrollments of student majors in related disciplines as a technique to determine program similarities. While the group did not rely heavily on this method, they concluded that it may be useful in making detailed program analyses. (Interested readers should see the *Technical Diary* [Topping forthcoming].)

Modifications to the NCHEMS Costing and Data Management Software (CADMS)

The CADMS software was sufficiently general and flexible to support the parts of the cost study for which it had been designed. Its use in this study, however, was complicated by the four sources of funds and the multiple objects of expenditure. These additions, together with the basic complexity of MRUs, resulted in large matrices and extensive computing time.

Furthermore, the use of the multiple fund sources and modified direct costs called for additional programs within CADMS and for data summaries and reports beyond the report-generating elements of CADMS. In particular, both MARK IV programs and the Table Producing Language (TPL) of the Bureau of Labor Statistics were needed to provide data in summary form.

This project found that programs in CADMS lacked sufficient tracking and control features. Extensive visual inspection was needed to ensure that data had been entered correctly. Many errors were found too late, making it necessary to rerun several programs to introduce corrected data. If CADMS is to be used extensively by MRUs, these error-testing and control features should be added, along with readily available tables for following allocation patterns in processing modified and full costs.

4

Conclusions Regarding Data Comparability

Conclusions from the present work concerning comparability must be carefully drawn. The validity of a comparative conclusion must be tested along two dimensions: the data employed must be *technically* comparable and, with respect to the questions posed, they must be sufficient to support *substantive* comparisons. Technical comparability of data is addressed through such questions as:

- Were the data defined in precisely the same way?
- Were survey instruments identical and were they administered under similar conditions?
- Were the same data categories used?
- Were data reported and aggregated using the same procedures?

Sufficiency for substantive comparability of these results raises such issues as:

- Are institutional standards for faculty engagement and student achievement comparable?
- Are courses and programs to be compared across campuses in fact comparable in content?

- Are institutional outcomes in instruction, research, and service comparable?
- Are there institutional policies or programmatic interactions at one campus that will affect the comparability of its data with those of another campus?

No statistical test can address this last set of questions; their answers can be found only by persons exceedingly familiar with the programs being compared. In the case of the major research universities (MRUs), such persons would be the department chairmen, academic deans, and vice-presidents or chancellors and their staffs who have administrative responsibility for the programs. The study group conducting the pilot test focused almost exclusively on the technical side of the comparability problem. This decision was not intended to diminish the importance of the substantive issues but reflected recognition of the fact that before any comparisons could be made, a technically consistent data base had to be assembled. Once this had been accomplished, selective comparisons could be made by each institution. Chapter 5 discusses the appropriate uses and applications of the Information Exchange Procedures (IEP) data set from an MRU perspective. This chapter assesses the group's achievements in technical comparability and discusses, in the context of the questions posed in chapter 1, the problems thus revealed in substantive comparability.

Question 1: Given institutional differences in accounting, organization, and so forth, can data be collected from a group of MRUs in accordance with NCHEMS Information Exchange Procedures under controlled pilot-test conditions so that the resulting information is reasonably comparable?

The present work has not accomplished this for either the technical or the substantive dimension of comparability. This does not mean that such a result cannot be achieved. The study group was inclined to conclude, however, that significantly better success than that achieved here would require a predesigned protocol, collaboratively developed in advance of data collection.

Limitations on the technical comparability of data were discussed in the previous chapter. Following is a summary of factors tending to undermine the technical quality of the results and of steps taken to mitigate their effects:

- *Problem:* There were few apparent discipline and program matches when comparisons were based on four-digit HEGIS codes.
  Response: Aggregation to a modified two-digit HEGIS code improved apparent comparability, but without assuring substantive comparability in curricular details or programmatic purposes.
- *Problem:* Dual-level courses were at first not consistently assigned to IEP course levels.
  Response: Modal level of enrollment was adopted for classification. Practices varied so widely, however, that a possible substantive issue of comparability in these data remains.
- *Problem:* Institutional policies varied on assignment of credit for thesis or dissertation work.
  Response: Assignment of one unit of dissertation work for each term of registration, converted in later stages of analysis to full-time equivalency by multiplying by nine student credit hours.
- *Problem:* Each institution used a different faculty-activity survey.
  Response: A common set of faculty activities was agreed upon, which permitted approximate mapping of each institution's unique instrument onto a single base. A certain amount of detail and precision of definition were lost in this procedure.
- *Problem:* In some instances, faculty-activity analyses (FAAs) covered different time periods.
  Response: Participants derived information from best available data but at a significant cost to accuracy.
- *Problem:* Populations included in the FAAs varied among the six institutions.
  Response: Some major deviations by single campuses were retrospectively corrected, but significant differences remain in the results. This primarily affected the comparisons of student-faculty ratios.
- *Problem:* Institutions differed in sources of faculty-activity information (self-reporting vs. institutional assignment).
  Response: Introduction of the concept of modified direct effort addressed the major incomparability encountered. Again, some detail was lost in this procedure.
- *Problem:* Policies differed in recognition and costing of departmental research.

Response: Widely differing levels of faculty activity from FAAs (5.9 to 19.0 percent) were uniformly prorated back to instruction, eliminating the possibility of costing departmental research as a separate activity or of allocating a portion of the cost of departmental research to sponsored research activities.

- *Problem:* Institutional practices in accounting for indirect-cost recovery (ICR) varied.
  Response: In the latter stages of analysis, general and ICR funds were collapsed. The study group was not satisfied that the results of this step were fully capable of substantial comparison.
- *Problem:* Not all fringe benefits were reflected in institutional financial statements.
  Response: Adjustments were made to include fringe benefits paid by a state agency and graduate-tuition waivers as costs of instruction.
- *Problem:* Some institutions were part of multicampus systems.
  Response: Services provided to a campus by a central administration were costed and included; costs of services by a participating institution to another campus were excluded.
- *Problem:* Institutional practice varied as to what constitutes direct and indirect costs.
  Response: A consistent distinction between direct and indirect costs was made and applied retroactively to the institutional accounting records.
- *Problem:* Institutional practices varied as to which activities were treated as auxiliary enterprises and as to the comprehensiveness of inclusions within the auxiliary-fund group.
  Response: Definitions were developed but inconsistently applied so that any comparisons among auxiliary enterprises were questionable.
- *Problem:* The test year could not be consistently defined for all institutions because of absence of summer-school data at one university.
  Response: None. At the one university, support costs for a full year were allocated to nine months of instructional activity.
- *Problem:* IEP lacks a mechanism to reflect regional cost differences.
  Response: None. Regional differences in cost of living for the six pilot-test institutions differed by as much as 25 percent. Moreover, the institutions experience different climates and consequently different energy costs. Such differences are important to recognize before making further comparisons.

Question 2: Does IEP have the capability to deal with interactions among instruction, research, and public-service characteristics of MRUs?

As indicated in chapter 3, this question reflects the weakest conceptual and procedural link in IEP. IEP instructs the user to prorate its faculty activities on the basis of primary intent. Coupled with funding source, this procedure served as the primary basis for allocating faculty costs to instruction, research, and public service. While the task force did not applaud this procedure, they knew of no other that could solve the problem, given the faculty-activity data available for the study.

Question 3: Do existing information exchange procedures adequately account for different sources of funding in complex, research-oriented universities?

No. The original IEP made no attempt to differentiate costs by source of funds. As explained in chapter 3, the MRU study introduced four funding sources into the IEP cost study: general funds, indirect-cost-recovery funds, restricted funds and auxiliary funds. The distinction that gave the pilot-test institutions the greatest problem was that between general and indirect-cost-recovery (ICR) funds. Some institutions recognized ICR as a separate funds source within their accounting records and could therefore track those expenditures separately. Others did not distinguish ICR funds as a separate source and therefore had to prorate a percentage of general funds to reflect those expenditures. For purposes of comparability, these two fund categories were collapsed in many analyses. However, the task force recommends maintaining the four separate fund groups whenever the underlying accounting data will support such a level of detail.

Question 4: Do existing information exchange procedures adequately define direct and indirect costs to permit comparisons among major research universities?

From an accounting standpoint, the division of costs into direct- and indirect-cost pools did not hinder this cost study. The accounting systems of the six participating institutions were surprisingly consistent in their handling

of accounting chargebacks. IEP as currently written is relatively explicit in the types of costs considered direct and those considered indirect (or support costs) *Procedures for Determining Historical Full Costs* (1977), pp 2.14-2.17. This definition was augmented by the study group's further delineation of costs (Topping, forthcoming, Step 5).

Question 5: Do the costing procedures recommended by the existing information exchange procedures adequately reflect the consumption of support services in major research universities?

The study group did not examine this particular question as part of the pilot test. To do so would have required collecting extensive data from each university to capture and reflect usage patterns for each support service. In the case of libraries, for example, circulation records for each university library would have to be examined to determine users, to allocate costs to those users, and to match costs with the student programs in which users were enrolled. Given the magnitude of the problem, this task would have been very costly.

Instead, the pilot group adopted the uniform allocation guidelines of IEP with some minor modifications (Topping forthcoming, Step 7). These guidelines should be applied uniformly at each institution to ensure consistency in the final results. For the most part, this consistency was achieved at the pilot-test institutions.

Question 6: How similar are major research universities to one another? To other postsecondary institutions?

All six pilot-test institutions share a similar mission: to promote the public interests of the university as a place of education, learning, and research. Furthermore, each institution has been categorized as a research university by the Carnegie Commission on Higher Education. The Commission made this designation according to the amount of federal financial support received by the institution for research in the science and engineering disciplines as well as the number of Ph.D. degrees awarded. In addition, each of the six institutions is supported predominantly by public funds. The study group agreed at the beginning of the study that the institutions shared enough traits to make programmatic comparisons potentially meaningful.

However, the six universities differed in many respects. They were located in different geographic regions of the country. Two are situated in metropolitan areas, the other four in small cities. While their missions are fundamentally similar, there are important differences. For example, Illinois and Purdue are land-grant universities and consequently devote a larger share of their resources to agricultural research and cooperative extension. Washington and Stony Brook have health science centers located on the campus of the parent university, while in three of the four remaining universities, the health-related programs are offered on separate campuses.

In addition to differences related to mission, there were important differences in size. In this study, Illinois, Purdue, and Washington, which constituted one comparison group, had student bodies, faculties, and budgets roughly two to three times as large as those of the other three institutions. All three are comprehensive universities offering a full range of student programs at all student levels. Sponsored research activities accounted for nearly one-fourth of their total expenditures.

The Universities of Colorado and Kansas, which emerged as a second comparison group, had student bodies, faculties, and budgets of similar size. Neither is the land-grant institution in its state, and both emphasize similar disciplines and programs. Sponsored research, while a major component (on the average, 17 percent for 1975-76) of each university, was not of the magnitude of that of Illinois, Purdue, and Washington. Programmatic profiles of these two universities differed significantly from those of the larger three.

Stony Brook, the most recently established and smallest of the six universities, constituted a special case. Its instruction program was about one-third the size of that of Purdue, Illinois, or Washington and roughly half that of Colorado or Kansas, based on the number of student credit hours taught. Stony Brook emphasizes programs in engineering, mathematics, and the physical sciences (high-cost disciplines), particularly at the graduate level, and does not offer graduate work in business and education (low-cost disciplines). Although the research component at Stony Brook was relatively large (19 percent of total expenditures for 1975-76), it was restricted mainly to engineering and the physical sciences. Located in the New York metropolitan area, Stony Brook operated at a cost-of-living exceeding that of the other five universities.

Given these technical difficulties associated with IEP and these differences among even apparently similar institutions, what can be said regarding comparability of data?

- Hierarchies of unit effort, or cost by level of instruction and discipline within one campus, were reasonably consistent with those of the other institutions. Overall cost ratios by level of instruction were 1.0 (lower division), 2.0 (upper division) and 4.0 (graduate). High-cost disciplines (such as engineering or the physical sciences) tended to be about two and a half times more costly than less expensive ones (such as psychology and other social sciences), though this varied by institution and level of instruction. The traditional assertion of MRUs was supported: no meaningful assessment of resource requirements can be made without attention to these differences.
- Variability on a particular level and discipline index, in terms of either cost or effort, was significant across the campuses and increased with level of course or student. Cost variability among institutions was approximately ±20 percent of the mean at undergraduate levels and approximately ±40 percent of the mean at graduate ones. It is unclear whether this was due to differing faculty-activity analyses, differing allocation strategies, or a combination of both.
- No conclusions can be made regarding sponsored research, public service, and their relationship to instruction.
- Apparent coherence of data increased when analyses were performed of student-program rather than discipline costs. This finding suggests that student-level designations were more consistent across the six institutions than were course-level designations.
- Within each institution, full unit costs were highly correlated with modified direct costs, across student programs and disciplines, and across student and course levels. (Correlation coefficients often exceeded .95.) For interinstitutional comparisons, full costs may be more comparable than modified direct costs because institutional differences arising from accounting practices, organizational structures, and funding levels for indirect-cost centers were minimized during the latter steps of the costing procedures.

Throughout the pilot test, the MRUs encountered many problems that impaired technical comparability of their data. Adjustments were made for some of these problems, but others could not be easily corrected. In part, pilot institutions were handicapped by having to conduct a cost study after the fact, particularly with the faculty-activity data. In addition, the study group felt that the protocol statements should be more complete and more

fully discussed by the participants before collecting any data. Staff at the participating institutions stated that costly data re-runs could have been avoided if they had been better informed at the beginning of each procedure. Finally, the study group concluded that the study could have been conducted more efficiently if the time frame had been shortened. MRUs attempting to replicate this study should not expect to produce technically comparable data during the initial year, which should be viewed as a test year. In the second and third years, however, attempts at producing cost data among a group of similar institutions should increase the validity of those data.

5

Concluding Remarks and Institutional Observations

The six institutions involved in this study undertook to test the applicability of the Information Exchange Procedures (IEP) in the major research universities (MRUs). Throughout the study, conceptual and technical problems were encountered. These were addressed and, in some cases, procedures were modified to reflect the complexities of the MRU.

What are the strengths and weaknesses of IEP from an MRU perspective? First of all, IEP constitutes a set of well-developed, well-documented procedures for performing cost analysis at both the full- and direct-cost levels, with emphasis upon instruction. Developed under the direction of a national task force, IEP was pilot tested in 60 institutions of varying size and type before being released for general use. In addition, IEP has associated computer software to support the development of discipline and program-unit costs.

IEP facilitates the development of unit costs of instruction that can be used in comparing not only entire institutions but also individual programs. These procedures enable one to summarize data at several levels and at different degrees of detail. Finally, IEP is the most widely publicized and perhaps the most commonly used costing model in the country. Since its introduction, several hundred institutions have attempted to implement it.

Nevertheless, IEP is extremely cumbersome, requiring significant staff time to conduct a cost study. IEP requires substantial levels of detail, regardless of whether one is attempting to study an entire institution or a small section of it. IEP spreads costs to basically three cost objectives (instruction, research, and public service), as opposed to a larger number of cost objectives that may be of more importance to institutional administrators and regulatory agencies. Because IEP relies on a generalized program structure, administrators may have difficulty reconciling final cost data to their particular organizational and administrative structures. Moreover, IEP relies heavily on a faculty-activity analysis to spread costs to these three cost objectives. As this study has demonstrated, faculty-activity surveys must be designed and conducted in precisely the same way to produce comparable cost information. In many instances, this will be an impossible condition to meet. Prospective participants in a cost study should realize at the outset that failure to meet this condition will substantially weaken the final results.

The question of comparability of cost data was of major concern to the participating institutions. At the conclusion of each step of the costing process, time-consuming review procedures were followed. At each point, the study group decided that while differences did exist among the six data sets, these differences were not fundamental enough to halt the pilot test. At the end of the pilot test, the group concluded that even though the data were neither substantively nor technically comparable, significant strides had been made toward achieving technical comparability. The group also thought that with repeated applications and with well-defined protocols *written and agreed to in advance of data collection,* the chances of producing comparable data sets would be significantly improved.

But achieving technical comparability is only half the battle. IEP contains no mechanism capable of assessing the similarities or dissimilarities of the underlying activities being compared. The study group referred to this dimension as *substantive comparability* and agreed in principle that a review of underlying program activities was vital to any successful information exchange. The pilot-test group did not develop any procedures or protocols for accomplishing this task. However, the other subgroup of the MRU task force addressed this question and developed a prototypical program statement that examines the goals, objectives, and curricula of programs being compared. In this area, the two subgroups, while working independently, begin to reinforce each other. Future exchange efforts among MRUs should examine

the work of both subgroups to better understand the complexities of information exchange.

The study group discussed the potential uses of cost data from an MRU perspective. In general, IEP was designed to highlight cost differences among academic disciplines and student programs. It is retrospective in that it examines data from a past period, usually the last academic or fiscal year. Its applications, however, are often prospective, since past cost behavior is often used as a criterion for justifying existing levels or changing resource-allocation patterns in successive fiscal periods. Because higher education lacks well-defined, measurable outcomes, cost data from comparable programs and institutions often serve as guidelines in determining budgetary allocations.

Various uses for cost data can be postulated for MRUs. For example, department chairmen and academic administrators could analyze course-taking and resource-utilization patterns. Institutional administrators may find cost data useful in studying resource-distribution patterns among departments and disciplines as well as in reviewing curricular and degree patterns. The use of cost data by state agencies external to the university presents a conflict for the MRU. MRUs have an interest in presenting cost data at a sufficient level of detail so that programmatic differences and their associated costs are clearly evident. However, MRUs often fear that external agencies will use detailed information to enact accountability and control procedures at a similarly detailed level. Nevertheless, it is clear that many state agencies have a need for and can use cost, resource, and student information in funding, program-review, and formula-development projects. The appropriateness of collecting and analyzing specific types of information, including cost information, would depend on the context and process for decisionmaking within each state.

This report should not be interpreted as a blanket endorsement of IEP for use within an MRU environment. Like other large-scale costing models, IEP still has both conceptual and technical problems. Nevertheless, the pilot test described in this study made significant strides in correcting many of them. MRUs recognize the role that cost information often plays in resource-allocation decisions—both within the university and in governmental agencies. Given this role, it is important for MRUs to have the capability of producing timely and valid cost information. It is in this spirit that the study was undertaken and its recommendations offered.

Institutional Observations

The author intended to conclude this document with a discussion of the potential applications of cost data from an MRU perspective. However, he quickly discovered that not all universities are of one mind on this subject. Some representatives of the pilot-test institutions stressed the utility of the data for *internal* management but warned against potential misuse of the data for *external* comparisons. Others argued that the only real use of the data was to be made by external agencies in allocating funds among institutions. Some contended that IEP as modified by MRUs was still deficient in many respects and should not be relied upon for cost comparisons among MRUs, while others were willing to accept IEP data as reasonable proxies for overall costs. In short, there was no consensus among the pilot-test institutions on this important subject. To resolve this dilemma, we asked each of the pilot-test institutions to draft a statement outlining its experiences with IEP and discussing potential applications of cost data from an MRU perspective. Their statements follow verbatim.

University of Washington and University of Colorado
Joint Statement Regarding
Potential Uses/Applications of IEP in MRUs

We are very concerned that the higher education community view the IEP project in its totality, that the reports of both subgroups of the task force be considered as elements of the same study. We believe that reports of the two groups have many significant areas of agreement, that the extent of this agreement was not fully realized until the pilot test was complete, and that these philosophical as well as procedural overlaps should be summarized. We believe that the two approaches and their apparent "coming together" indicate that cost analysis for MRU's should be carried on in the context of both reports, for only in this way can both substantive and technical comparability be addressed.

As the EA&A subgroup members became more familiar with each other and with the IEP procedures, there was a growing sense of unease about the applicability of IEP to major research universities, even though the group agreed to go forward at each individual step in the process. While members of the group ostensibly represented similar institutions, sufficient significant differences were disclosed that the application of IEP-MRU data to any real world policy problems is not advised.

The following points represent our view of the potential application of IEP data:

- —Unmodified IEP is not suitable for MRUs
- —With substantial modifications of the kind performed in the pilot test, IEP may provide a beginning place for internal analysis
- —Significantly improved technical and substantive comparability will require predesigned protocols for collecting accounting and expenditure data as well as uniform FAA instruments
- —IEP cannot be unqualifiedly endorsed for application across various kinds of institutions

We feel that another key to obtaining agreement about the validity of cross-institutional information is not only to have predesigned instruments but to have agreement on and understanding of the potential applications of the data.

In general the IEP approach, admirable and methodologically correct as it may be, is so expensive, complicated and fraught with potential error that we believe simpler approaches may be more appropriate guides to public policy in this area.

University of Illinois
Potential Uses/Applications of IEP in MRUs

The four cells in the following matrix provide a perspective for an evaluation of the potential uses/applications of IEP in MRUs.

Data Base \ Users	Internal	External
Single MRU	(1)	(2)
Multiple MRUs	(3)	(4)

The *columns* of the matrix represent internal (institutional) or external (funding body or coordinating agency) *users* of data produced by IEP. The *rows* represent the IEP *data base,* i.e., a single MRU or multiple MRUs.

Cell (1). Institutional User—Single MRU. Since each of the six task force institutions applied IEP to its own data, there is no question that IEP *can be used* for institutional self-study by MRUs. The University of Illinois found the IEP software to be reasonably easy to use; and, to produce information similar to that resulting from internally developed software. The potential uses/applications of IEP by MRUs for internal purposes can be answered individually by each MRU by comparing the costs and benefits of using the IEP software versus those of developing their own. On balance, it is likely that those institutions that have invested heavily in their own programs to produce IWLMs, unit costs, and so on will maintain those programs, while institutions that have not developed their own software might find IEP to be attractive.

Cell (2). External User—Single MRU. An MRU might find IEP to be useful to produce information for external agencies in the same manner as for its internal purposes. However, external use of information about a single MRU, or any other single institution, is marginal, other than for the establishment of trends for that institution. Note that we have precluded a judgment of the combination of IEP information for MRUs with that of non-MRUs in this cell, since this task force only contained MRUs.

Cell (3). Internal User—Multiple MRUs. MRUs might choose to exchange information produced by IEP for their internal use. When evaluating

the application of IEP for inter-institutional data exchange, we found it useful to further segment this cell as follows:

Campus- or System-Level Administration	
a) Internal Use	c) External Use
College or Departmental Administration b) Internal Use	

a) Campus- or System-Level Administration—Internal Use and *b) College or Departmental Administration—Internal Use.* Inter-institutional data exchange among MRUs of IEP-produced information probably would focus on such items as productivity ratios and modified direct or full costs by discipline and program and course or student level. The task force did not address the question of *substantive comparability,* and IEP by its very nature *cannot* address that question. Thus, we feel that the techniques suggested by the Measures and Definitions Subgroup are more appropriate for inter-institutional data exchange *if* the intended use of the data is internal, e.g., to assist central administrators in budgeting or college deans in program evaluation.

c) Campus- or System-Level Administration—External Use. Central administrators of MRUs, including the University of Illinois, have found the exchange of certain items of information to be of value, e.g., the annual exchange of faculty salaries by rank and discipline. When using such information, it is clearly understood that each and every discipline is not substantively comparable between the respective institutions. Nonetheless, the judicious application of the aggregate data, e.g., by eliminating salaries of clinical faculty for some purposes, has been found useful for reaching some "over-all" conclusions concerning the level of salaries at a given institution vis-a-vis its peers.

The University of Illinois feels that a simplified or reduced data base (versus that used in the EA&A study) produced by IEP could be usefully exchanged by MRUs to help them assess "overall" levels of funding, particularly with respect to their instructional programs. This reduced data base would be limited to *one fund source* (either General or the combination of General and ICR funds), i.e., restricted and auxiliary funds would be eliminated, and would contain modified direct and full costs of instruction by 2-digit HEGIS discipline or student program and course or student level as suggested by the task force, along with the credit hours in each of those

cells. This level of aggregation appears to be sufficient to "control" for basic differences in the magnitude and mix of instructional programs between MRUs, without becoming enmeshed in an evaluation of substantive comparability for each program. Obviously, any such information exchange would have to be based on a set of data that was reasonably comparable technically, particularly with respect to the HEGIS mappings and financial protocols. This level of technical comparability appears to be achievable. While it is less likely that technical comparability can be achieved in the Faculty Activity Analysis (FAA), the use of the aforementioned reduced set of activities can enhance that likelihood. Moreover, the modified direct costs method suggested by the task force minimizes the need for precise technical comparability of FAA's, especially when the focus is aimed at an assessment of overall funding levels.

Cell (4). External User—Multiple MRUs. The University of Illinois views this cell to be similar to Cell (3-c) discussed above, in the same context as it is with the exchange of faculty salaries among MRUs. That is, MRUs would engage in inter-institutional (IEP) data exchange and would provide certain results of that data exchange to external agencies following a protocol agreed upon by the exchanging institutions.

Summary. The University of Illinois' position on the application/use of IEP for MRUs is as follows:

1. IEP's *internal use* for institutional self-study can be evaluated by each MRU on purely cost/technical grounds. Based upon such evaluations, the MRUs might choose to implement all or portions of the IEP software.
2. IEP does not support detailed *internal* program or budget analyses based upon inter-institutional comparisons because it does not address the issues related to substantive comparability. The techniques proposed by the Measures and Definitions Subgroup appear to be better suited to such analyses.
3. IEP could support the exchange of data between MRUs at a level of detail described above, where the objective of such data exchange is to assess overall *instructional* funding levels in a manner similar to the comparison of overall faculty salaries. The University of Illinois encourages the development of such exchange groups and would be willing to participate in them.

University of Kansas
Potential Uses/Applications of IEP in MRUs

The University of Kansas generally supports the concluding remarks of Chapter 5 based on its experience as a member of the Experimental Application and Analysis Group. However, several comments relevant to the use of IEP in a major research university environment are necessary.

While there is little question that there are significant structural differences between major research universities and nonmajor research universities, there are also significant differences between MRUs. These differences must be controlled for when an MRU chooses peers for comparison purposes. Within the task force there were several distinct differences among participating MRUs. Institutional size and mission was one obvious factor. Another was the co-mingling of land grant institutions, nonland grant institutions and institutions which specialized in a limited number of well supported programs. The results of the MRU-IEP project may well have been more meaningful had the comparisons accounted for these variations. Many of the cost comparison differences can be attributed in part to the lack of institutional uniformity and may have helped to obscure IEP's capability to support a meaningful comparative analysis among MRUs.

The project was also limited by the task force's inability to perform comparative analysis in the research and public service sectors. Part of this limitation was caused by the confounding differences resulting from the research and public service mission in a land grant university as compared to a general purpose state university. Moreover, the task force was not able to sufficiently define common denominators for public service and for research which would make these costs as meaningful as instruction has become for institutional comparison purposes. This limitation creates an overemphasis upon instruction as the final cost objective in MRUs, thus raising serious questions concerning the use of IEP as an appropriate cost analysis tool for MRUs. While we recognize that there are limitations in any cost study, we are concerned that the above problems not be overlooked by zealous users of cost comparison data. Our ability to cost instruction in such detail, while not having comparable analytical support for research or public service, suggests that instruction is the primary factor in MRU comparisons. This may incorrectly imply to the lay person that instruction is the sole measure of institutional performance in MRUs.

Finally, there is a critical need in MRU-IEP for more emphasis in costing the support areas, specifically in library, academic administration, student services, institutional support and physical plant. Funding agencies as well as university administrators may well desire to compare expenditures in these areas as well as those related to the institution's academic mission. The ability to develop measures of comparability among institutions for these support areas could result in much more meaningful and usable studies.

In summary, the University of Kansas believes that appropriately modified, IEP and similar cost analysis techniques can be used effectively for comparative analyses across major research universities. By controlling for differences such as institutional size and mission, more useful comparisons can be made.

Purdue University
Potential Uses/Applications of IEP in MRUs

Various cost studies and data exchanges have prevailed in the higher education community for many years. Perhaps the simplest and most frequently requested information relates to salaries, both individual by position or averages.

These data exchanges found a receptive audience in institutional administrators, as they examined their own institutions and presented their case to external agencies. Similarly state officials and legislative groups found them helpful in carrying out their allocative decisions process. Use of data by institutions, state agencies and legislative groups is almost certain to continue.

For internal purposes, comparing departments, programs, cost, etc., or for a single institution's external purposes, the Information Exchange Procedures (IEP) provide a complete set of easily adaptable computer programs. Although these procedures can be more easily run in smaller, less complex universities, they also can be run at the larger more complex institutions participating in this project.

What then, are the problems confronting major research universities (MRUs), state agencies, or legislative groups using IEP for providing data input purposes?

To answer this question these procedures must be broken down into their various components: student data, personnel data and financial data.

Given a reasonable student record system the student data module is a very useful tool in analyzing courses taken by student majors, on the average, and to whom departments taught courses. This module is equally successful for large complex universities and smaller less complex schools.

The problems encountered in this specific project did not revolve around the systems designed to carry out these tracking processes, but rather the differences in student program labels, course levels, departments and the consistent assignment of credit hours, particularly at the graduate level. With some amount of effort to assign these labels consistently there should not be problems with comparability or accuracy resulting from this part of the exchange procedures.

As in any cost study Purdue University has been involved with, the most difficult part of the information exchange procedures was the assignment of faculty effort, or the so called personnel data.

If an institution, agency, etc. feels a great need to identify all faculty effort into detailed components: undergraduate or graduate instruction, public

service, non-sponsored research, student counseling, professional development, etc.—major research institutions will always have difficulties as they will with IEP. A potential solution to these difficulties would be to predetermine detailed definitions of the various activities which are carried out and then design a system to collect this information. It is questionable whether even this process would result in greater comparability.

If on the other hand, the audience for whom the study is being conducted is willing to accept that the mission of an MRU is to carry out non-sponsored research, public service, graduate instruction, professional development, etc. and that these are all necessary parts of the instructional function, the detailed reporting of these activities is eliminated along with the definitional problems associated with them.

At Purdue University and in the multi-institutional studies conducted in the State of Indiana, it has been accepted that all of these non-sponsored activities carried on by our faculties are part of the instructional programs we offer. Thus, we have eliminated the necessity to cost these activities separately (separately budgeted activities such as AES, CES, etc. are excluded). Admittedly this decision probably increases the cost of instruction, if one could separate these functions from pure instructional activities or presumed that they are not part of the instructional mission. This procedure allows the majority of cost to be assigned to the most commonly identified unit of student programs, and/or credit hours.

The problems encountered by the MRUs in this project primarily resulted from procedures contained in the personnel portion of IEP calling for the specific identification of these various activities and our inability to develop definitions for them which would allow the identifications called for.

While the MRU project did aggregate some functions, there was sufficient concern about definitions used among the institutions to cause the resulting information to be suspect.

The third and final step in the exchange procedures is the so called account crossover module which brings the financial data into the proper accounts for costing. Original IEP procedures, which were quickly discarded, moved the dollars around without consideration of source of funds, in such a way as to make them completely useless for an institution accepting and spending so called restricted dollars. Once this problem is solved it is still necessary, in multi-institutional comparisons, to examine carefully the accounting and related management practices of the institutions to ascertain relative consistency in the financial data before the crossover procedures are employed.

Again, if the audience is willing to look at all cost as full cost of instruction, many of these problems are eliminated. It then makes no difference if computer, library, physical plant, etc. cost is direct charged or aggregated into cost centers with the charges layed back on some reasonable basis.

The above descriptions point out some of the problems encountered in employing the NCHEMS Information Exchange Procedures at major research universities and presumably at non-major research institutions. They should not however, lead to the conclusion that exchanges of the type of information produced by IEP are impossible. They are possible but must be accomplished through carefully controlled and examined steps, focusing on what the desired outputs and uses are.

With appropriate effort IEP can be modified to serve these purposes as has been done by the publicly-supported institutions in the State of Indiana.

State University of New York at Stony Brook
Potential Uses/Applications of IEP in MRUs

Stony Brook has welcomed the opportunity to participate in both the Experimental Application and Analysis and the Measures and Definitions subgroups of the NCHEMS Task Force. We have benefited greatly from both.

The Measures and Definitions report is of fundamental significance in establishing means by which MRUs might be substantially compared, taking adequate account of their inherent complexity and of essential academic differences in their superficially similar programs. Its application as a single campus exercise produces important results in improved understanding of mission, status, and planning quite independent of its utility for interinstitutional comparisons. It is unfortunate that MRUs have not had the foresight to press this form of assessment previously.

Even though measures like IEP permit at best only a primitive representation of an MRU, the work of the Experimental Application and Analysis group has been extremely important as well.

- IEP is widely applied by reviewers of higher education. Any MRU that functions within a diversified system or that draws significant resources from multipurpose national programs of support to higher education should expect that such measures will be applied to it. The probability is high that such comparisons will result from the reasonable insistence of public decisionmakers. Affected MRUs should be prepared to assist in that process; preferably, they should supply leadership in advance of need in exploring its pitfalls.
- Even if a history of results from the Measures and Definitions procedures were in hand, it would still be necessary to report some results with procedures similar to IEP. That report could then be qualified by more sophisticated analyses of substantive differences not uncovered in the IEP format, but the generalization of IEP developed here would still be necessary to meet the insistent demands of external decisionmakers. We at MRUs who are accountable to multiple constituents should be prepared to map our responses to questions into the language that we know must be available to our reviewers or should expect others who have less insight into our programs to do so for us.
- It is correct that technical comparability between one MRU and a selected number of other MRUs can be more rapidly and economically obtained

by mapping the others onto the single MRU than by mapping all into a single, generalized structure. However, this technique applied more than a few times in particular cases leads to scholarship beyond our groves. The importance of the basic assumption that we in the Experimental Application and Analysis group set out to test in our generalization of IEP—that there exists a single, sufficient framework to sustain technical comparisons of a set of MRUs—persists in spite of the availability of this option for quicker results.

- We say candidly however, that there probably is no MRU that can internally benefit by mapping its customary measures of resources and products into a generalized IEP. The extra effort required for a consistent representation is entirely to respond to demands for external comparisons.
- While we have been at this work another urgency has been added to our task: the impending federal requirement for information concerning full effort of faculty engaged in sponsored research will doubtless be followed by the insistence of state agencies that they receive the same data about their research-intensive campuses.

We agree with much of the commentary from the other participants concerning how the generalization of IEP to MRUs might be improved, but would add these points:

- Comparisons of direct and modified direct indices should concentrate equally on faculty effort and cost measures. It is not a weakness of IEP that the analyses of the pilot-test institutions were predominantly on costs; that resulted rather from pressures of time. However, this concentration on cost measures yielded final data which were systematically incomparable to the 20 percent level because of cost-of-living and consequent salary differences at one institution.
- Stony Brook regrets that the choice of a retrospective approach led to data which precluded an attempt to address the question of joint products; MRUs will now have to address that question individually.
- Stony Brook does not agree that total unit-cost results are of technically higher quality than modified direct costs. The additional consistency which may result from combining the costs of institutional support activities with instruction is bought at the price of inclusion of additional data which may introduce very substantial differences, either because of

differing institutional practices or because of substantial regional cost differences (e.g., utilities).

- Indeed, Stony Brook questions the usefulness of the total cost results of IEP for MRUs, and urges that service and support costs be measured only by function and with the same attention to differences in policy and practice which IEP bestows on instruction. In discussions between MRUs, no significance can be assigned to the single difference, total less direct costs. We should encourage our reviewers to examine primitive data in this area as consistently as we encourage them to consider instructional data which have been sufficiently disaggregated to show differences by instructional level and discipline.

Stony Brook would welcome opportunities to repeat the Experimental Application and Analysis drill, applying the lessons of this exercise to improve technical comparability. We would also welcome an opportunity to test with other MRUs the Measures and Definitions instrument.

Bibliography

Bacchetti, Ray; Carlucci, Carl; Harris, Adrian; Lelong, Don; Richmond, Rich. "Introductory Notes by the Advisory Committee." In *Information Exchange Procedures for Major Research Universities: Alternative Conceptual Approaches,* by Jim Topping and Ed Myers. Boulder, Colo.: National Center for Higher Education Management Systems [NCHEMS], forthcoming.

Gamso, Gary S., and Service, Allan L. *Introduction to Information Exchange Procedures: A Guide for the Project Manager,* Technical Report 76. Boulder, Colo.: NCHEMS, 1976.

Harris, Adrian H. "Apples Are Never Oranges: The Comparability Question Revisited." Paper prepared for the 1978 Forum, Association for Institutional Research, Houston, Tex., May 24, 1978.

"Major Research Universities Experimental Application and Analysis Subgroup Statement of Purpose." Internal working paper, NCHEMS, Boulder, Colo., May 24, 1977.

NCHEMS. "Board of Directors Agenda." NCHEMS, Boulder, Colo., September 28-29, 1975.

NCHEMS. "Board of Directors Agenda." NCHEMS, Boulder, Colo., November 16-17, 1975.

Procedures for Determining Historical Full Costs. 2nd Edition. Technical Report 65. Boulder, Colo.: NCHEMS and the National Association of College and University Business Officers, 1977.

Topping, Jim. *Technical Diary of the Major Research Universities' Pilot Test.* Boulder, Colo.: NCHEMS, forthcoming.

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3.5C:779:LP:Rob:2BA317